

Lightweight Small-Scale Turbine Generator, Phase II

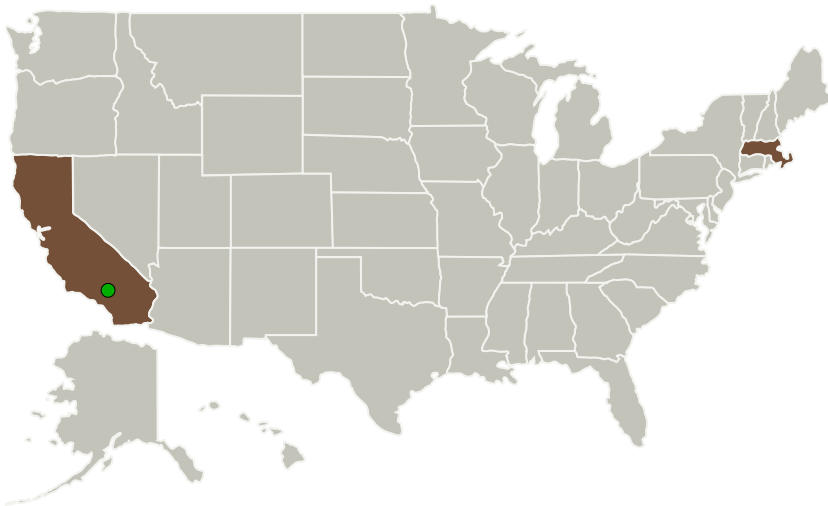
Completed Technology Project (2014 - 2017)



Project Introduction

The proposed innovation is a power conversion technology that will help achieve NASA's Fundamental Aeronautics Program (FAP) goals of reducing emissions and increasing fuel efficiency for high speed flight. NASA's objective to increase the specific power of high efficiency electric components in order to make a 10 mega-watt onboard power generation and/or utilization feasible for propulsion requires the development of sub-scale technologies to support the development and validation of newer turbo-electric aircraft and embedded boundary layer electric propulsion systems. Compact and lightweight turbine generators scaling from the kW to MW class are needed to transition high speed aircraft to hybrid electric propulsion systems. Metis Design Corp is developing a lightweight, compact, gas turbine generator that draws on recent innovations in the fields of permanent magnet generators and turbomachinery, to achieve a target power density of over twice the state-of-the-art and the potential to scale to 100's of kW. The proposed turbine engine uses a lightweight, two-spool configuration that eliminates the need for the heavy reduction gearbox required by state-of-the-art systems. Phase II of this SBIR effort will develop a detailed design, then fabricate and test the complete turbine generator sub-system in a laboratory environment.

Primary U.S. Work Locations and Key Partners



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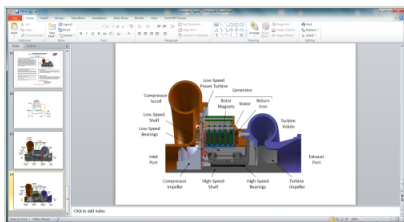


Organizations Performing Work	Role	Type	Location
Metis Design Corporation	Lead Organization	Industry	Boston, Massachusetts
● Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California

Primary U.S. Work Locations

California	Massachusetts
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Images



Briefing Chart

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(<https://techport.nasa.gov/image/130341>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Metis Design Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Rory Keogh

Co-Investigator:

Rory Keogh

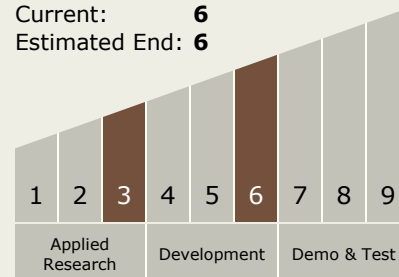
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Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.9 Hybrid Electric Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System